EXHIBIT E1

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Theory of Identification as it Relates to Toolmarks*

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The theory of identification as it pertains to the comparison of toolmarks enables opinions of common origin to be made when the unique surface contours of two toolmarks are in "sufficient agreement".

2. This "sufficient agreement" is related to the significant duplication of random toolmarks as evidenced by the correspondence of a pattern or combination of patterns of surface contours. Significance is determined by the comparative examination of two or more sets of surface contour patterns comprised of individual peaks, ridges and furrows. Specifically, the relative height or depth, width, curvature and spatial relationship of the individual peaks, ridges and furrows within one set of surface contours are defined and compared to the corresponding features in the second set of surface contours. Agreement is significant when it exceeds the best agreement demonstrated between toolmarks known to have been produced by different tools and is consistent with agreement demonstrated by toolmarks known to have been produced by the same tool. The statement that "sufficient agreement" exists between two toolmarks means that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility.

3. Currently the interpretation of individualization / identification is subjective in nature, founded on scientific principles and based on the examiner's training and experience.

Range of Conclusions Possible when Comparing Toolmarks

The examiner is encouraged to report the objective observations that support the findings of toolmark examinations. The examiner should be conservative when reporting the significance of these observations.

1. IDENTIFICATION - Agreement of a combination of individual characteristics and all discernable class characteristics where the extent of agreement exceeds that which can occur in the comparison of toolmarks made by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool.

**Editors Note: This was originally published as an AFTE Glossary Revision, in June of 1994. It was distributed at the AFTE Training Seminar in San Diego, California, in June, 1995. It is printed in this form to be able to insert it into the AFTE Glossary. The first paragraph listed under the "Range of conclusions" as well as the "caution statement" in the Subclass Characteristics definition were inadvertently omitted from the original 1994 printing.*

2. INCONCLUSIVE -

A. Some agreement of individual characteristics and all discernable class characteristics, but insufficient for an identification.

B. Agreement of all discernable class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility.

C. Agreement of all discernable class characteristics and disagreement of individual characteristics, but insufficient for an elimination.

3. ELIMINATION - Significant disagreement of discernable class characteristics and/or individual characteristics.

4. UNSUITABLE - Unsuitable for microscopic examination.

Accidental Characteristics Term formerly used to mean INDIVIDUAL CHARACTERISTICS. See INDIVIDUAL CHARACTERISTICS.

Individual Characteristics Marks produced by the random imperfections or irregularities of tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage. They are unique to that tool and distinguish it from all other tools.

Impression Contour variations on the surface of an object caused by a combination of force and motion where the motion is approximately perpendicular to the plane being marked. These marks can contain CLASS and/or INDIVIDUAL CHARACTERISTICS.

Striations Contour variations, generally microscopic, on the surface of an object caused by a combination of force and motion where the motion is approximately parallel to the plane being marked. These marks can contain CLASS and/or INDIVIDUAL CHARACTERISTICS.

Subclass Characteristics Discernable surface features of an object which are more restrictive that CLASS CHARACTERISTICS in that they are:

1. Produced incidental to manufacture.
2. Are significant in that they relate to a smaller group source (a subset of the class to which they belong).
3. Can arise from a source which changes over time.

Caution should be exercised in distinguishing SUBCLASS CHARACTERISTICS from INDIVIDUAL CHARACTERISTICS

Toolmark, Impressed Marks produced when a tool is placed against another object and enough force is applied to the tool so that it leaves an impression. The class characteristics (shape) can indicate the type of tool used to produce the mark. These marks can contain CLASS and/or INDIVIDUAL CHARACTERISTICS of the tool producing the marks. Also called COMPRESSION MARKS.

Toolmark, Striated Marks produced when a tool is placed against another object and with pressure applied, the tool is moved across the object producing a striated mark. FRICTION MARKS, ABRASION MARKS and SCRATCH MARKS are terms commonly used when referring to striated marks. These marks can be either CLASS and/or INDIVIDUAL CHARACTERISTICS.